Labelling and other measures for heating systems – industry's perspective

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Abstract

Energy labelling for household appliances has become an established instrument to promote energy efficiency. For heating systems, however, this approach has not been successfully implemented yet. This is partially due to the reluctance of industry.

To find ways to motivate industry to participate in a labelling scheme, we carried out a survey among producers of heating systems. Respondents to our questionnaire and personal interviews cover together more than 30 percent of the EU market for heating systems. Thus the results provide a solid basis for conclusions.

Our survey helps to draw a much better picture of the attitudes and expectations of the manufacturers with regard to a labelling scheme. The paper covers:

- Attitudes regarding potential effects of a label;
- Opinions on possible design of a label;
- Perceived effects of the labels for the companies;
- Perceived advantages and disadvantages of a label;
- And, as a conclusion, the potential effects on the companies and their probable relevance.

As a result, industry representatives expect that customers will be able to make sounder purchasing decisions because of the availability of a label. Therefore they believe that energy savings will be achieved. What is more, respondents expect that a label could improve integration of the European market for heating systems and would rather improve their individual economic performance.

The survey results in a clearer identification of industry's problems, needs and interests. It thus will help policy-makers to get industry to support energy efficiency labels and activities.

Introduction

In 1995 about 7 760 PJ (2 150 TWh) or 21% of total final energy consumption were used in the EU (15) for space heating and associated hot water production in households, including electricity used by central heating (pumps, fans, etc.) (Iles et al. 2002, 2003). This resulted in CO_2 emissions of about 570 million tons per year (17% of total emissions per year) emitted by heating systems in the EU. Heating systems for dwellings are thus one of the biggest single energy consumers and CO_2 emitters in the EU.

As a scenario analysis shows, this value will gradually decline over the next two decades. However, a huge potential for energy savings remains that can be addressed by policies and measures targeted at consumer decisions. Potential savings are quantified at between 10 percent – attainable by short-term measures – and a third.

The EU started to address these potential energy savings in the early 1990s with the European Boiler Efficiency Directive (Council Directive 92/42/EEC). The directive imposed minimum efficiency standards for oil and gas-fired boilers and also introduced a labelling scheme with four ef-

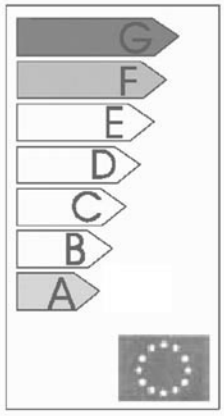

Figure 1. *Established label for efficiency classes in the EU.*

ficiency categories defined as 1 to 4 stars. However, the minimum standards defined in the directive are relatively low compared to the current best available technology and the labelling scheme was never really adopted by the majority of heating systems' manufacturers. Some national regulations effectively require substantially higher efficiency standards (e.g. the German "Heizanlagenverordnung" which was converted in 2002 into the "Energieeinsparverordnung;" Lechtenböhmer 2002b).

As a next step the Commission is discussing the introduction of a new labelling scheme for heating systems following the broadly known and accepted A to G scale. A proposed possible labelling scheme was developed during the SAVE study "Labelling and other measures for heating systems in dwellings"[1] (Iles et al. 2002 / Iles 2003). As one task of this study, the authors carried out a stakeholder impact analysis (Lechtenböhmer & Wagner 2002). Our focus was on the attitudes and opinions of industry towards a possible labelling scheme for heating systems.[2] In the following we first give some information on the market for heating systems and how a label could affect manufacturers in theory. Then we present the main results of our survey. Finally we draw up our conclusions on which problem groups exist among industry and how relevant they might be.

The EU market for heating systems and possible effects of a labelling scheme

As a background to the survey and the analysis of industry's opinions, we give a brief overview of the EU market for heating systems and the relevant stakeholder groups. We also discuss some possible effects of a label on manufacturers by using the theory of how efficiency labelling schemes transform markets for appliances.

HEATING SYSTEMS

Modern heating systems usually consist of a boiler that transforms the fuel (natural gas, oil, coal or biomass) into heat that is distributed by a distribution system to the heat emitters; usually radiators. Together with the controls and thermostatic valves at the radiators this is called the heating system. However, there are different systems such as electric systems, single room heaters and district heating systems. As the efficiency of the distribution system (tubes and emitters) depends mainly on the design and quality of the individual installation the manufacturers can influence this field only indirectly. The focus of our survey was therefore on the boilers and electric heating systems.

RELEVANT STAKEHOLDER GROUPS

The network of actors who determine the choice of a heating system comprise three main stakeholder groups. All three are involved in the decision-making process for the installation or replacement of a heating system in a dwelling. All three groups would more or less be affected by policies trying to transform the market of heating systems in the EU and especially by the introduction of a labelling scheme for boilers.

1. First are the customers who have to be subdivided into owner-occupiers, tenants and landlords. Aided by the label they will be able to make sounder purchasing decisions and to take an active role in the decision-making process. The individual relation between costs and benefits of the measures proposed will mainly determine further effects for the consumers[3].
2. The second group are the installers who sell and install the heating system and who have a great influence on the relevant decision-making processes when a new heating system is purchased and installed[4]. They have to inform consumers about efficiency measures such as labels, etc. To take over this task, installers will need to improve customer communication skills. In general, introducing a labelling scheme and other measures for improving energy efficiency tend to increase their economic opportunities.
3. The focus group of this paper is clearly the manufacturers of heating systems. On the one hand they are important players influencing the efficiency of heating appliances. On the other hand it is their products and their market at which a labelling scheme and other measures are targeted.

ASSUMED EFFECTS OF A LABELLING SCHEME

Figure 2 shows how the introduction of a labelling scheme and the introduction of minimum standards would be expected to transform the market for heating systems. The

1. The project developed a stock model and scenarios for the European market for heating systems. Based on this, market barriers and opportunities for more efficient heating technologies were discussed and different options for a labelling scheme were discussed.
2. This paper is based on the findings of the survey we carried out within the SAVE study. More information on methods used, the detailed questionnaires and more detailed descriptions of results and findings are included in the aforementioned publication (Lechtenböhmer & Wagner 2002).
3. Here, a lot of possible combinations may occur, as not all consumers are customers (purchasers and owners of the heating system). E.g. tenants often do not own the heating system. The landlord buys and owns the system but tenant pays the energy bill. However, in general one can say when the saved energy costs (including saved energy taxes etc.) tend to be higher than the additional capital costs of better equipment consumers will have a profit.
4. However, the installer does not always 'sell' the system. Others may be involved such as fuel suppliers and merchants, including DIY outlets. The equipment stocked by merchants can have a big influence on what is specified by installers.

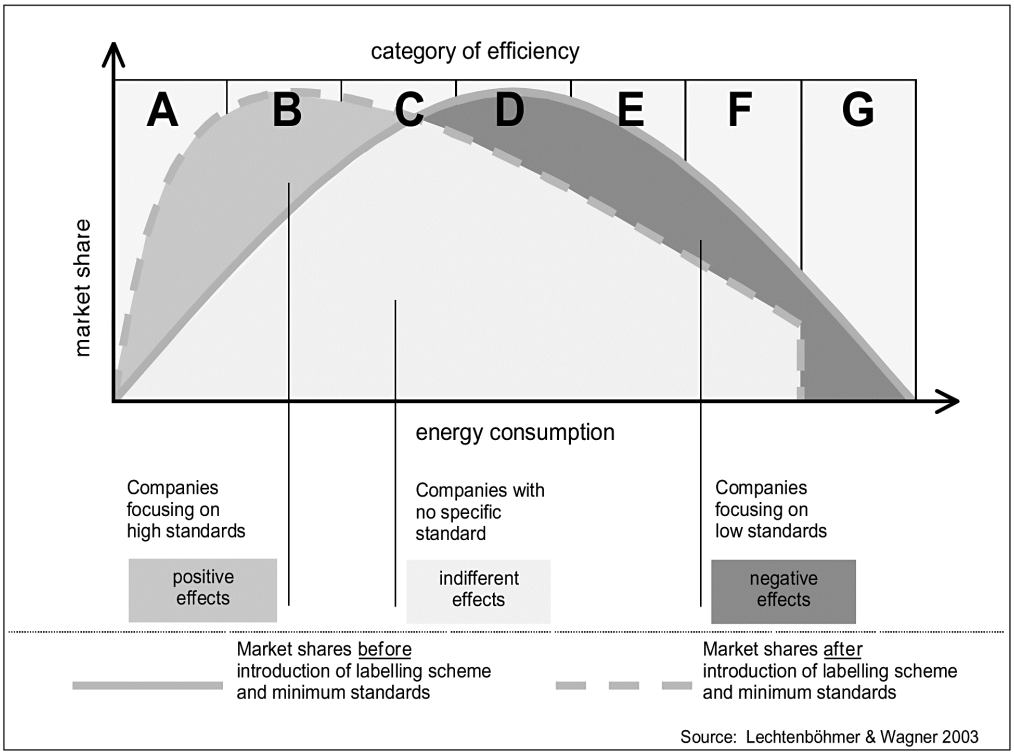

Figure 2. *Potential effects of a label on different types of companies.*

solid line shows the expected situation before introduction of energy policies. It is assumed to represent a Gaussian or normal distribution. Most boilers sold are in energy efficiency Class D. The number of units with very low energy consumption is approximately as high as the number of units with very high consumption.

The label transforms the market by improving the information of consumers and enabling better informed purchase decisions. This will – in theory – lead to an increased market share of units with lower energy consumption (broken line). Removing the least efficient models (Class G) from the market – by the means of a mandatory minimum efficiency standard or a voluntary agreement with industry – results in further changes of the market.

The introduction of a labelling scheme will – in theory – result in different effects on heating systems' producers according to their current production portfolio and their possibilities to adapt to the expected market changes.

Companies focusing on highly efficient systems before the introduction will be the probable winners of the introduction of a labelling scheme. Likewise companies that are able to adapt their product range faster than others may gain advantages. The losers will be those enterprises which have a product range focused on inefficient devices and that are unable to react fast and change their policy or can only do so with great effort.

Menanteau and Colombier (1997) examined the effectiveness of the EU energy label for refrigerators. They give proof that the Euro label makes dealers change their range toward more efficient devices. Independent of customer behaviour regarding the Euro label, the changed range of products led to customers more frequently buying efficient devices. Also, a so far unpublished study from the Wuppertal Institute within the scope of the "Energy+ project"[5] proved that a labelling scheme transforms the market and that manufacturers adapt to the schemes. The Wuppertal Institute could show that the energy consumption of refrigerators and freezers are oriented to the efficiency classes of the established label (Pfahl 2001,177). This can be clearly seen from the vertical points concentrating along the different limit values in the following illustration. Waide (2000) obtained similar results.

Whether these assumptions are correct and reflect the expectations of the manufacturers of heating systems will be analysed in our survey. We will also try to further explain and differentiate between the possible negative effects of the expected market transformations on the producers of heating systems regarding the real market structures which are much more complex than theoretical analysis reflects.

THE EU MARKET FOR HEATING SYSTEMS

The comparison of heating systems by country in Figure 4 shows that there are many differences between the European countries. The fundamental reason for this is the existence and utilisation of own energy resources as well as the existing infrastructure. The Netherlands, for example, have large natural gas resources; consequently the rate of gas heating is especially high (nearly 100 percent). In contrast, in Sweden and Finland a natural gas supply is almost nonexistent. Here the markets are very complex with high

5. Energy+ is founded on an open dialogue and co-operation with the different actors and participants.

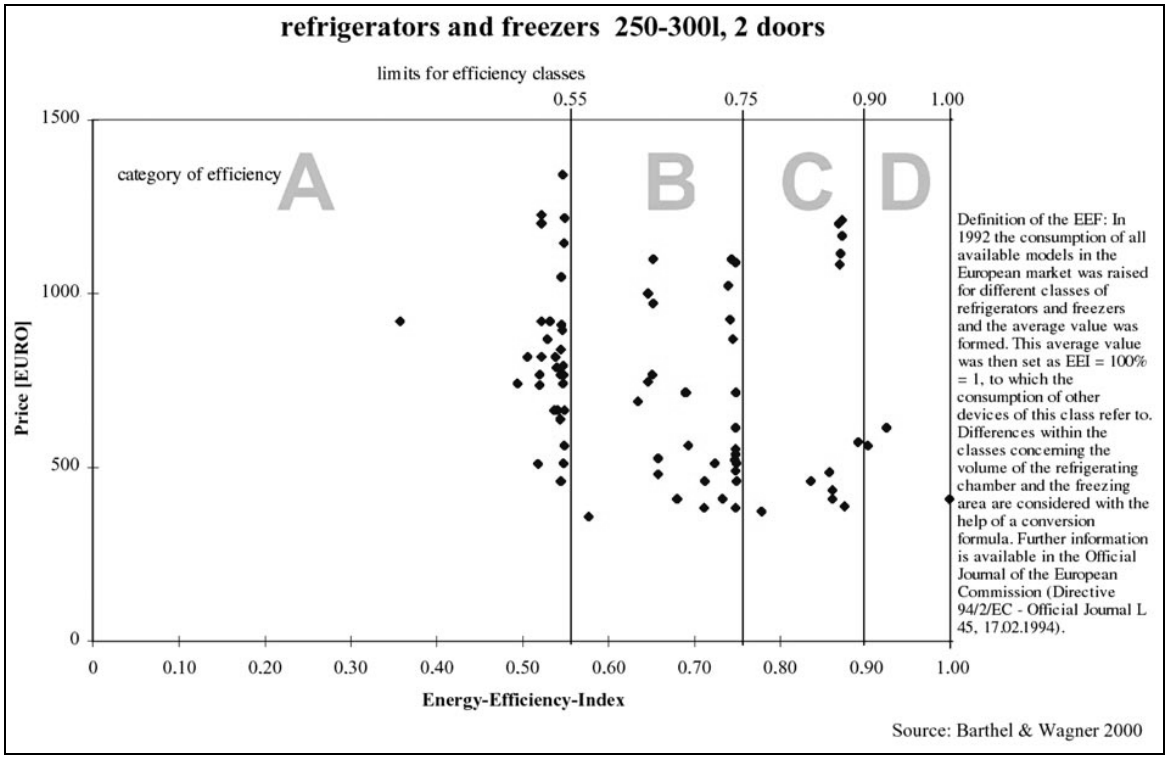

Figure 3. *Efficiency comparison of 90 refrigerators and freezers.*

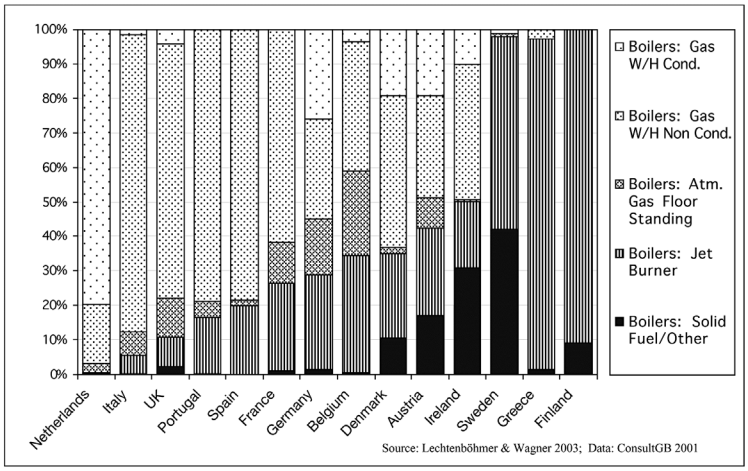

Figure 4. *Markets for boilers in the EU (excluding electric systems and district heating.*

shares of electricity, biomass, wood and oil. The Greek market is dominated by oil heating. Here also a natural gas supply practically does not exist. In all other EU-15 countries, gas-fired heating systems dominate the market with shares between 50 and 90 percent.

Condensing boilers are the currently most energy-efficient gas-fired heating system. Their market share varies substantially between the specific national markets. In the Netherlands condensing boilers dominate the market with about 80 percent of all devices sold. In Germany, Austria and Denmark – as well as in Sweden where gas is unimportant in absolute numbers – they have close to a 50 percent market share of gas-fired heating systems. In Ireland condensing boilers currently make up for about 20 percent of gas-fired devices sold. The UK just has a share of about 5 percent but with clear signs of a take-off in the future. In Belgium, Italy and France condensing boilers still have smaller market shares but in all these countries further increases are possible if market conditions and administrative measures support the still small but growing trends. Portugal and Spain are the only gas-dominated markets in which condensing boilers are uncommon.

Companies producing devices with low efficiency standards are mainly found in those countries where these low-standard products dominate the market. For the gas-fired heating systems, which form the vast majority of the European market, this is mainly the case for the markets in the UK and Ireland and the markets in the southern countries such as Spain, Portugal and maybe parts of Italy. In Greece gas-fired heating systems are unimportant.

Survey: Perceptions of industry representatives

STUDY DESIGN, SCOPE AND METHODOLOGY

As a part of the SAVE project mentioned above we analysed possible impacts of a label on heating systems on relevant stakeholders. The focus was on the manufacturers of heating systems. By the choice of companies and interview partners and a questionnaire sent out to 35 manufacturers representing more than 60 percent of the European market, we tried to obtain an overview of industry's opinions that is as wide as possible. Our work also included theoretical research estimating the effect on manufacturers. Responses to

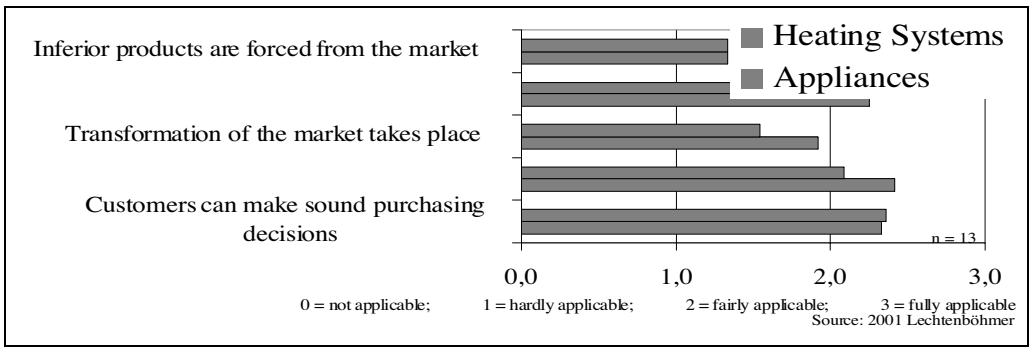

Figure 5. *Attitudes towards efficiency labels on household appliances vs. a label on heating systems.*

the questionnaire were received from 14 companies in 5 countries, representing more than 30 percent of the EU market. All field research was carried out between spring and fall of the year 2001.

The sample contained companies of all sizes. Six were big companies with over 1 000 employees, all being among the top ten of the European heating producers. Another six companies were medium-sized enterprises with between 100 and 500 employees. Additionally we were able to include the opinions of two small companies with less than 100 employees and of one intermediate company with between 500 and 1 000 employees. By inviting three relevant market associations – EHI (European Heating Industry), AFECI (Association of European Manufacturers of Instantaneous Gas Water Heaters and Wall-Hung Boilers) and MARCOGAZ (European Natural Gas Suppliers) – to a meeting and talking to their representatives, the common position of the industry was also included[6].

As a further basis for our conclusions we used the results of other tasks of the SAVE projects regarding market structures, current regulations and the design of a potential labelling scheme for heating systems (Iles et al. 2002), the most recent market analysis of fossil-fired heating systems in the EU (Consult GB 2001), a representative survey of all British manufacturers (Sharpe 2001), and the current developments and trends surveyed at the most recent European heating trade fair, ISH 2001 (Sbz 2001a,b,c).

ATTITUDES REGARDING POTENTIAL EFFECTS OF A LABEL

Figure 5 shows that heating system manufacturers regard energy efficiency labels for heating systems as slightly less effective than the labels on other household appliances that exist in the EU. However, it is believed that customers can make sounder purchasing decisions because of the availability of a label and therefore respondents think that energy savings will be achieved. Most companies regard a label as a good instrument to use in their company's marketing campaign.

Contrary to this opinion, the possible transformation of the market is estimated as not very significant – and certainly lower than for other appliances. That inferior products would be forced from the market is – as for appliances in general – hardly believed. In line with these perceptions is the expectation of respondents that manufacturers will pay just fairly more attention to the energy consumption of their appliances.

PERCEIVED EFFECTS OF THE LABELS ON THE COMPANIES

Companies could imagine that the prices for heating appliances could rise and that ecologically sound appliances will become more economical. A second possible result of a label could be that it would support the ongoing integration process of the European market – especially if national labels were removed.

Potential problems to the introduction of a labelling scheme are not perceived as very high. Few respondents believe that industry will experience problems with sales. Respondents also have no big fears that product cycles will be shortened or small companies will be forced from the market. They anticipate neither loss of sales, nor high costs for converting production. Consequently, changes of location and reductions in workforce are not regarded as possible consequences of a label. Seven out of 13 companies estimate their ability to adapt to the changed market conditions as above average and see themselves as winners of the introduction of a labelling scheme. Most other companies claim an average position.

However, companies producing electric heating systems did have a differing point of view. They do in fact fear losses in sales and to a certain degree also high costs of converting production if their products are included in an integrated labelling scheme. Consequently they also expect problems with a reduction in workforce but no consequences regarding the location of companies. Some producers of fossil-fired systems fear the opposite effect. They mentioned that separate labels for all energy carriers could mean a disadvantage for gas and oil-fired systems in southern European markets, and therefore have possibly unwanted substitution effects in favour of electric systems.

6. However, with the time and budget given, a really representative survey of the total European heating systems industry was not possible. All results are therefore to be interpreted with appropriate care. Responsibility for all hypotheses and conclusions is with the authors alone. And we cannot guarantee that we really included all relevant opinions. But we hope that the sample shown above gives a deeper insight into industry's views.
We would like to thank all respondents to our questionnaire and in particular our interview partners and the representatives of industry associations for their valuable contributions to our research.

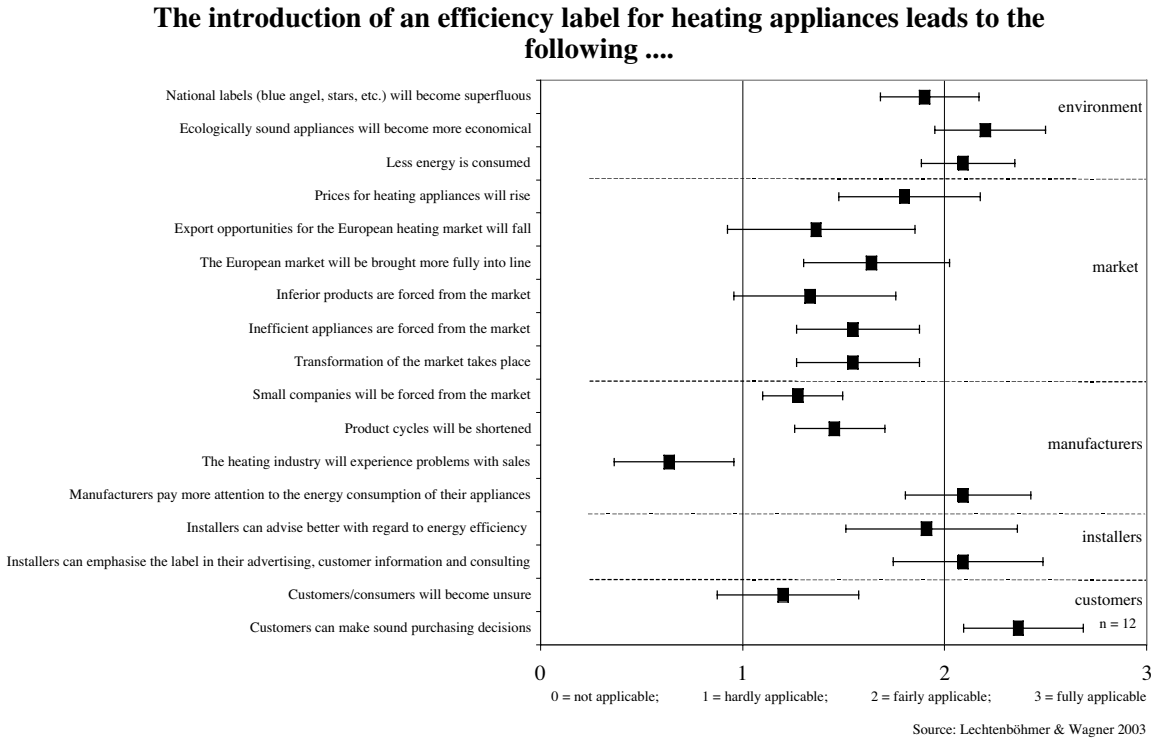

Figure 6. *Effects of an efficiency label for heating systems.*

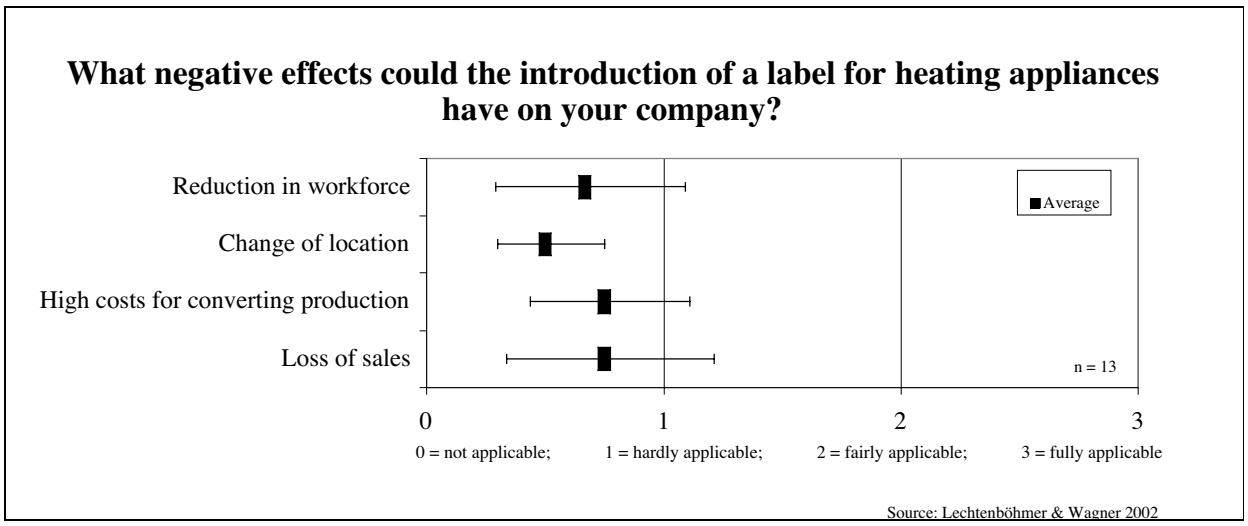

Figure 7. *Negative effects of a label on manufacturers.*

POSSIBLE LOSERS FROM A LABEL – FOUR PROBLEM GROUPS

Most manufacturers of heating systems do not seem to expect very severe consequences from the introduction of a labelling scheme. Also, about half of the companies that responded to our questionnaire see themselves as clear winners from such a scheme. Only one company expected to be a loser. Nevertheless we tried to theoretically analyse special market segments and groups of manufacturers that could possibly be affected by an energy efficiency label. The possible direction and extent of effects was estimated using market information and information gathered by the survey. The results therefore have to be regarded more as plausible estimates than as well established facts.

For this purpose we derive some hypotheses on which groups of companies might be affected by a possible label. The real effects will of course be closely connected to the total effectiveness of the label and its detailed design. The hypotheses about effects of a label are:

- Companies producing only or mainly low-standard boilers could be forced from the market by labelling and subsequent legal measures.
- Companies which produce heating technologies that have lower rankings in an integrated labelling scheme

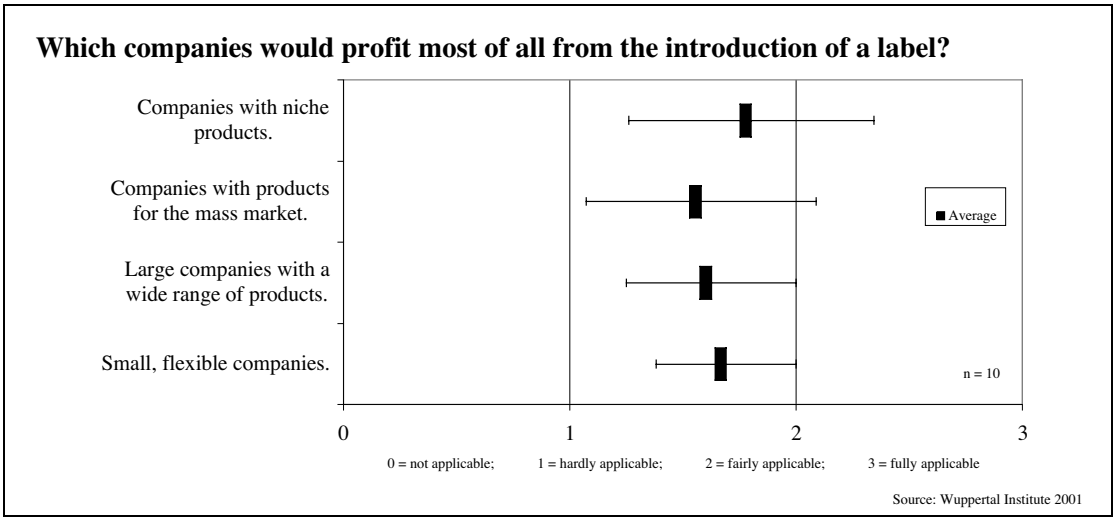

Figure 8. *Company types profiting most from the introduction of a label.*

compared to competing energy carriers could also be affected. This would probably apply to electricity as an energy source for heating and to a far lower extent to oil. Other energy carriers like biomass and solar systems and even electric heat pumps are more likely to profit from such effects.

- Small and medium-sized producers could be affected because they might have administrative problems applying for a label and because of a lack of capacity to follow the market trends promoted by the label.
- By introducing energy efficiency labels and other measures, trends toward concentration in the market for heating systems could be promoted.

Group 1: Producers of low-standard appliances

The first problem group is of course obvious in theory. But we did not find much evidence in our survey that it is a real problem. Regarding the bulk of the market we looked at the top 5 European producers of heating systems, which together sell more than 40 percent of all heating systems in the EU and more than 50 percent of all gas-fired heating systems. All of them have condensing boilers in their product range, accounting for 10 to 50 percent of units sold. Only for the biggest Italian producer, Riello, does this technology have a much smaller share of output. From this point of view, higher standards do not form a bigger obstacle to economic development among the top 5 heating producers. Only the British market leader Baxi faces bigger changes in product range because the inefficient types of back-boilers and cast-iron wall-hung boilers make up about 75 percent of sales. The situation for the medium-sized companies seems to be analogous. Many of them are active in the segment of more efficient products and most would be able to produce systems with higher efficiency. A survey of all British producers found that all manufacturers make condensing boilers and suppliers could meet a much higher demand for condensing boilers if they had to (Sharpe 2001). Today's market share of condensing boilers is about 5 percent in the UK. We made similar assessments in our own survey regarding southern European producers.

Group 2: Producers affected by substitution of energy carriers

Producers of electric systems brought up the second hypothesis that substitutions of energy carriers might have negative effects on some companies. Generally a quick look at the markets for electric heating systems shows that the sales of conventional electric systems could be affected by the introduction of an integrated labelling scheme based on primary energy efficiency. This could be a source of trouble for those producers who are typically not active in the segment of fossil-fired boilers. But it also seems to be clear that regarding their main segment, the replacement market, substitution of an electric heating system by a fossil-fired one always needs a decision for a completely new system. This fact will prevent the market at least in the short and medium term from radical changes. Producers of electric heat pumps, however, could also be among the winners of a labelling scheme, as our interviews showed.

On the contrary, a separate labelling scheme and other measures targeted only at fossil systems could make them more expensive and therefore less competitive compared to electricity in the warm climates of southern Europe, namely Spain and Portugal and possibly also in the south of Italy and the south of France. In these cases an integrated label would not have negative substitution effects on oil and gas, which separate labels could possibly have.

The first result of market analysis in the case of substituting oil by gas is that most companies produce gas and oil-fired appliances. If the market concentrations are looked at, it is evident that the market for gas-fired appliances is more dominated by the big producers than the market for oil-fired ones. An effect could thus be a strengthening of the ongoing concentration processes in the industry. For most individual producers, however, an adaptation strategy would be possible for usually both types of devices are produced.

Biomass fired and solar heating systems[7] are currently niche-products. But in some markets, such as in Austria, Germany and Sweden, their markets are rapidly emerging. In most cases these systems are more efficient or emit less than fossil-fired technologies. As they contribute to the policy objective of using renewable energy, some Member

Table 1. Market concentration of the different segments of the boiler market.

	Market Volume (1 000)	Leading producers	Top 5
Boilers: Gas Wall Hanging; Condensing	660	76%	72%
Boilers: Atmospheric Gas Floor Standing [a)]	470	72%	56%
Boilers: Gas Wall Hanging; Non Condens. [b)]	3 310	62%	46%
Boilers: Jet Burner	990	61%	35%
Boilers: Solid Fuel/Other	120	33%	20%
Total	5 550	66%	41%

[a)] UK & IRL: including cast iron, combi, system and light-weight-vented,
[b)] UK & IRL: including commercial and back burners

Source: Lechtenböhmer & Wagner 2002, based on Consult GB Data

States and many municipalities support these technologies. As well-informed and environmentally aware customers usually purchase them, they could clearly profit from a label that shows their high efficiency in terms of primary energy consumption and/or emissions.

Group 3: Small and medium-sized producers

The third hypothesis is that the some one hundred small and medium-sized producers of heating systems would face management or administration problems when applying for a label and also do not have the capacity to follow the market trends promoted by the label. Because this group is very big and has extremely diverse structures, it is not easy to really verify this hypothesis. One result of our survey was that companies with niche products and small flexible companies are expected to profit a little more from a label than others.

However some possible problems of a labelling scheme apply especially to small and medium-sized companies. The first problem is bureaucracy and the costs of a possible label. This is more of a problem for medium-sized companies as they are active in several national markets and in this case have to compete with the market leaders. Small companies on the other hand typically operate in restricted national or even regional markets and thus usually do not have the problem of different legislation and/or labels.

The second problem is that small companies doubt whether a neutral label would give them a better opportunity to prove that their products are of comparable quality. In their view the reason for this contradiction is that the main problem is not to convince installers and consumers of the quality of their products, but merely to become known as an alternative to the dominating brands.

Group 4: Companies affected by concentration trends

The fourth hypothesis is that by introducing energy efficiency labels and other measures, concentration trends in the market for heating systems are promoted. The background for this hypothesis is given in the following table. It is a fact that about three-quarters of all heating systems are supplied by the 47 leading producers. The five biggest companies supply 41 percent of the total market. The most concentrated market segment is that for condensing boilers, of which the five biggest companies sell 72 percent. Very flat concentration structures dominate on the other hand in the market for solid-fuel boilers, for which the leading producers hold only one third of the market.

These numbers may indicate that market concentration increases with the rising efficiency level of the heating systems. However, from the technical point of view it is a fact for many technologies such as condensing boilers, solar systems, heat pumps, etc., that more efficient technologies are not necessarily dominated by or restricted to bigger companies. In the contrary, many examples show that of these technologies were often introduced by small companies.

With these market patterns, it would appear that policy measures targeting at higher shares of more efficient devices could support the existing trends to higher market concentrations. On the other hand, it seems to be clear that actions promoting higher efficiency need not necessary be harmful to smaller companies. On the contrary, solar systems, heat pumps, biomass, etc., are niche technologies that bring market opportunities for innovative smaller companies.

Perceived advantages and disadvantages of a label

The last two questions of the questionnaire asked for a free description of the worst fears concerning the implementation of an efficiency label for heating appliances and the greatest advantage. Almost all respondents took the opportunity to state their opinions on these two issues.

The worst fears concerning the introduction of a label by the industry representatives are:

- That a new label will produce new costs for testing, approval, placement of labels and advertising.
- That this label will be difficult to understand for consumers and will just be an additional label to national labels.
- That testing and approval will not be objective. Here companies stated especially the fear of cheap and bad testing procedures in some countries of the EU.

Advantages are being expected in:

- Energy savings and reduction in emissions.
- A Europe-wide harmonised performance scale to compare products.
- Better information for the customers.
- Better prospects for energy-efficient and innovative products.

7. Solar heated water used for heating as well as domestic hot water.

Opinions on possible design of a label

In addition to the main purpose of the survey, we also tried to get a rough picture of the opinions of industry on how a label should be designed.

On many aspects industry representatives have very similar expectations. They believe that a label should be primarily targeted at the customers and not at the installers. It should also be easy to understand and standardised for Europe. Manufacturers think that the information given to the customer should be concentrated on relevant and understandable aspects. A majority agree to the proposal of a standardised information sheet that is added to the label as an appropriate and important supplement.

On central issues – whether there should be a separate label for each energy carrier, or whether one label should include all types of energy carriers by means of their efficiency, primary energy consumption or CO_2 emissions, and what parameters should be considered and to what degree when introducing a label for heating appliances – positions in industry are split and often clearly reflect the interests of the particular groups among producers of gas-fired heating systems, oil-fired heating systems and electric heating systems.

Half of our respondents are in favour of an integrated label for all energy carriers. The other half, including the companies producing electric systems, are more in favour of separate labels. Many respondents added arguments. However – apart from individual advantages or disadvantages – most respondents who favour separate labels state that otherwise (with an integrated label) gas gains an advantage over oil because the efficiency of gas-fired appliances is higher than that of oil-fired ones. On the other hand, this is exactly one of the advantages of an integrated label: that substitution potentials from oil to gas could be included in the effects of the label.

Industry representatives thought primary energy consumption to be the most accepted parameter for a label. The majority wants primary energy to be considered strongly and no one rejects it from consideration. Also accepted is the parameter on consumption of auxiliary energy. But respondents are split on whether to consider this parameter strongly or just slightly. On CO_2 emissions and emissions of other gases as well as final energy consumption, about half of the respondents are positive. But as always, especially for final energy, there is a strong fraction against considering this parameter.

Conclusion: Potential effects of an energy label on heating systems and their probable relevance

The focus of this paper and the survey we carried out within the framework of the SAVE project was the manufacturers of heating systems (Lechtenböhmer & Wagner 2002). They are important players influencing the efficiency of heating appliances, and it is their market that will be affected by a labelling scheme. Our work included theoretical research estimating the effect on manufacturers, and interviews. Responses to a questionnaire were received from 14 companies in 5 countries, representing more than 30 percent of the EU market. However, our survey is not fully representative and may have a slight bias as the majority of companies that answered were German – nevertheless German companies also dominate the EU market. By inviting relevant market associations to a meeting and talking to their representatives, the common position of the industry was also included.

Four hypotheses about the effects of a label were considered as follows.

- Companies producing low-standard boilers could be forced from the market. Little evidence was found that this is a problem as most companies manufacture efficient systems in their product range.
- Companies that produce systems that rank lower in a labelling scheme could be affected. This would probably apply to electricity, and to a lesser extent to oil, if one single label based on primary energy for all energy sources were introduced. However, substitution of an electric heating system by a fossil-fired one requires a decision for a completely new system, and this fact will prevent radical market changes in the short and medium term. Producers of electric heat pumps, however, could also be among the winners of a labelling scheme, as our interviews showed. Energy sources such as biomass, and solar systems are also likely to profit from such effects.
- Small companies could be affected by administrative problems when applying for a label, and by a lack of capacity to follow the market promoted by the label. Because this group is very diverse, it is not easy to verify this hypothesis. However, there are concerns about the additional bureaucracy and costs.
- Introducing energy efficiency labels and other measures would promote trends towards concentration of the market. Promoting efficient systems could support existing trends towards market concentration. On the other hand, actions promoting efficiency may not necessarily be harmful to smaller companies. For example, solar systems, heat pumps, biomass, and other niche technologies would bring market opportunities for innovative smaller companies.

The survey and interviews as well as the existing market analysis gave similar results. Companies belonging to problem groups mentioned above seem to be not very widespread in industry. Also, no evidence was found that the possible effects would be really severe. This conclusion is strengthened by the expectation of industry that a label will have positive but quite limited effects.

However, we were not able to include all possible effects of the introduction of a labelling scheme into our considerations. Particularly the effects of such a scheme on the total market volume and the companies' revenues could not be analysed as we focused on current market volumes and information on revenues related to certain product categories or efficiency classes was not available. We also focused on the EU-15 market. But a label will also affect the markets and the producers of the accession countries as well as the possible exports of EU-15 producers to these markets.

As we focused on the issue of possible negative effects of a labelling scheme, we did not really look at possible positive effects on the market and the producers of heating systems. Some possible effects could be higher revenues because of the transformation in the direction of a high-quality market, altering customer awareness of heating industry's products which is currently very low, and finally a monetary and possibly also physical expansion of the market. These effects would add to the positive effects a labelling scheme has on energy consumption and the environment.

We can conclude that the introduction of a labelling scheme and other instruments for heating systems would – in the perception of industry – bring several positive effects. Energy consumption and emissions could be reduced and the negative effects on manufacturers seem to be negligible. On the contrary, there could also be (limited) positive effects for the market on the whole as for single manufacturers. Many of them see themselves as winners of such a policy.

However, the detailed design and implementation of the label is crucial for the effectiveness of the label as well as for the impacts on industry and finally the acceptance of this policy. The necessary additional information given with the label has to be balanced very carefully. Industry desires that a European label should replace existing national labels and not impose further bureaucratic barriers. It is also not fully clear what information should be included in the label. Most votes were for primary energy, which is slightly more difficult to calculate. However, a simple solution focusing on separate labels for all energy carriers and final energy efficiency as an indicator and simple measurements do not seem to find broad acceptance. Such a solution could face the same problems that the "stars" of the Boiler Directive had and which prevented this label from broader use in the heating industry.

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